

REMARKS

U.S. 5,789,644 to Paessler et al. (hereinafter, “Paessler”) does not suggest a process wherein a reaction mixture is rapidly cooled in a quench area, characterized in that in the quench area firstly a direct cooling to a temperature in the range from 650°C to 1200°C takes place by supply of an evaporating quench medium and subsequently in the quench area an indirect cooling in a heat exchanger takes place. Column 1, lines 28 – 36 of Paessler (reproduced below) teach direct cooling to a temperature below 300°C must occur to avoid decomposing the reaction mixture to soot and hydrogen.

the residence time of the acetylene-containing reaction gas, the cracked gas, is only a few milliseconds. After this time, during which the equilibria corresponding to the temperature level of 1500 to 2000 degrees Celsius cannot be established, the reaction products are quenched substantially instantaneously to below 300 degrees Celsius with water or preferably residue oil, so that the acetylene formed does not decompose into soot and hydrogen.

US 6,365,792 to Staph et al. (hereinafter, “Staph”) does not teach using indirect cooling in a process for carrying out a high-temperature reaction at a temperature of at least 1500°C and with a short residence time. Column 4, lines 4 – 6 of Staph states,

In contrast to known processes, the mean residence time in the reactor is comparatively long – it is generally at least 10 ms.

Column 4, lines 16 – 28 of Staph states,

‘Rapid quenching’ is regarded in the literature as a prerequisite for achieving acceptable acetylene yields However, quenching is only carried out rapidly because it is regarded as necessary to carry out the reaction at high temperatures (temperatures above 1400°C.) – if the residence times have to be kept short at the high temperatures, cooling must be carried out correspondingly quickly. It is therefore surprising not only that the preparation of acetylene/synthesis gas can also be carried out with comparatively slow indirect cooling, but also that the reaction can be carried out at temperatures below 1400°C.

Thus, Staph teaches, it is necessary to carry out the reaction at temperatures below 1400°C to allow a cooling in two stages (a direct cooling followed by an indirect cooling in a heat exchanger. In other words, according to Staph, indirect cooling can only be employed, when a comparatively long residence time is employed and the reaction is carried out at a temperature below 1400°C. Staph teaches, if the reaction is carried out at temperatures above 1400°C, the cooling in two stages is not quick enough to achieve an acceptable acetylene yield.

Both Paessler and Staph teach rapid cooling in one stage is necessary, if the reaction is carried out at temperatures above 1500°C. In fact, Staph teaches two-stage cooling can only be employed if the reaction is carried out below 1400°C. Thus, a skilled artisan had no reason to arrive at the present invention, a process wherein a reaction having a short residence time takes place at a temperature of at least 1500°C and wherein the reaction mixture is subsequently cooled, firstly by a direct cooling to a temperature in the range from 650°C to 1200°C and subsequently by an indirect cooling in a heat exchanger.

The rejection of claims 1 – 7, 20, 22 – 25, and 27, citing 35 U.S.C. §103(a), Paessler, and Staph should be withdrawn.

The rejection of claims 1, 8, and 10 – 19, citing 35 U.S.C. §103(a), Paessler, Staph, and US 3,640,739 to Bakker should be withdrawn.

The rejection of claims 8 and 10, citing the ground of nonstatutory obviousness-type double patenting and claims 1 and 4 – 6 of U.S. 6,869,279 to Bartenbach should be withdrawn.

The provisional rejection of claims 8 and 10 – 18, citing the ground of nonstatutory obviousness-type double patenting and claims 3 – 8, 12, 13, 16 – 18, and 21 – 23 of copending U.S. Application No. 10/806,232 should be withdrawn.

Fee Authorization

The Director is hereby authorized to charge any deficiency in fees filed, asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in

this application by this firm) to our Deposit Account 14-1437. Please credit any excess fees to such account.

Conclusion

The present application is in condition for allowance, and applicants respectfully request favorable action. In order to facilitate the resolution of any questions, the Examiner is welcome to contact the undersigned by phone.

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Respectfully submitted,
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A handwritten signature in cursive script that reads "Michael P. Byrne".

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